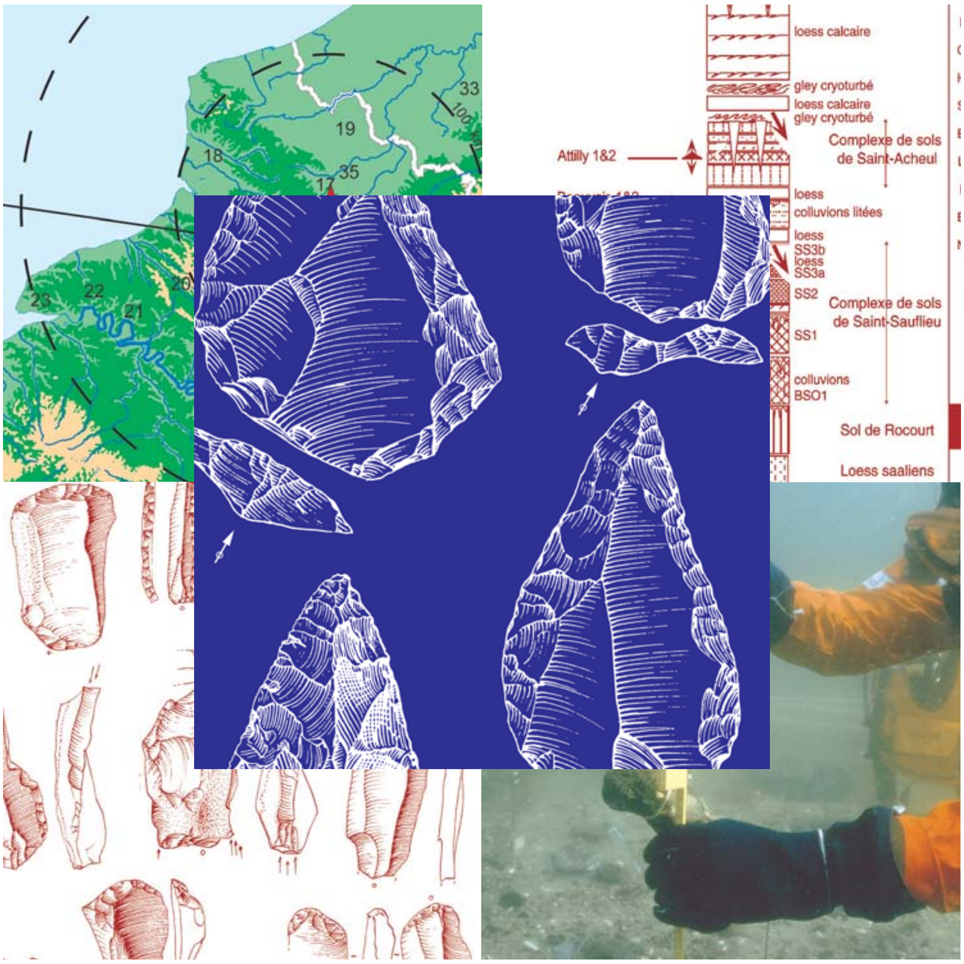

Liège 26 2006

N O T A E PRAEHISTORICAE

Liège - 16.12.2006
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D / 2006 / 7181 / 1

Notae Praehistoricae 26-2006 : 91-99

Some new insights in an old collection
Lithic technology at *Mesvin IV*

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Abstract

This article describes the lithic assemblage of *Mesvin IV* (Belgium), dated around 250 Ky, with the aid of an analysis of typological, technological and metrical attributes. The industry is characterized by the presence of both prepared and unprepared core technology. Handaxe technology and chopping-tools play a minor role.

Keywords: Middle Paleolithic, lithic technology, *Mesvin IV*.

1. Introduction

Mesvin IV is situated in the Haine basin some 5 km south of the town of Mons (Belgium). Excavations on the site during the late '70 - early '80 were part of a larger research program conducted by Daniel Cahen and Paul Haesaerts to study the Paleolithic occupations on the riverterrasses in this region. The site has been dated in a continental, cold stage within the Saale around 250 Ky based on chronostratigraphy, Ur-Th dates, palynological and faunal research (Cahen *et al.*1984).

The collection consists of 7438 lithic pieces, of which 4970 (about 70 %) were analysed in detail. This was done with the aid of an access database with fields containing information about position, taphonomy, raw material, typological, metrical and technological attributes. « Historical » information was also included (e.g. remarks on certain pieces in the personal notes of Cahen and Michel). A general list with information about the position and the type of blank was established for the remainder of the collection.

Reduction stage	*N*	*%*
decortification	884	17,8
preparation/rejuvenation	375	7,5
end products	3061	61,6
tools	132	2,7
cores	90	1,8
chips	225	4,5
undetermined	203	4,1
Total	*4970*	*100,0*

Tab. 1 — Reduction stages.

2. Analysis of the lithic industry

In this article we will describe the characteristics and technological attributes of the lithic industry. The industry has been subdivided in five technological categories, reflecting the possible reduction stage in which they belong (tab. 1). It is in a sense a simplified adaptation of the categories described by Geneste (1985) for Levallois reduction systems.

2.1. Decortification

Pieces belonging to the first category display between 50 % and 100 % cortex on their dorsal side, and are interpreted as belonging to the decortification phase. About 18 % of the blanks belong to this category. This seems to suggest that decortification is well represented at *Mesvin IV*. We are aware that smaller cortical flakes can be obtained during later phases of a reduction, as among others Dibble (1995) has pointed out. The metrical analysis shows that most of these so-called decortification blanks have on average a slightly greater length and width in comparison with blanks belonging to the category of end products. Following Dibble we checked the scar patterns of these flakes. Off course most of them are completely cortical (56 %). The second most important category consists of flakes with unidirectional scar patterns (33 %). Bidirectional, and especially multidirectional patterns occur rarely. Looking at the butt types we see that most of the butts are plain (30 %), cortical (21 %) or punctiform (20 %). Quite some pieces seem to be shattered (about 9 %). Prepared butt types are uncommon although the presence of some pieces with a facetted butt (2 %) has to be mentioned. Most of the decortification flakes do not show signs of knapping accidents (72 %), and if they appear they are most often stepped fractures (17 %).

Most of the described features are consistent with products detached in early stages of core reduction (scar pattern, platform types and measurements). But we realize that differences in sizes in comparison with end products are not very large and some products show clearly traces of a more intense preparation. In other words, some of these products probably were detached during full debitage.

2.2. Core preparation and rejuvenation

The next category of preparation/rejuvenation comprises all products which can be related to the (re)preparation of a core volume (e.g. crested blades, core flanks, *éclats débordants*, naturally backed knives), handaxe (of which bifacial thinning flakes are the easiest recognizable) and even modified tools (e.g. burin spalls). The difference between preparatory and end products is not always easy to make. For example 80 % of the flakes produced during handaxe manufacturing are not distinguishable without the aid of refitting data (Wenban-Smith, 1989). Concerning core technology, Baumler (1995: 14) concludes that analytical methods for making the distinction between tool blanks and preparatory blanks are not always straightforward and reflect perhaps *the point at which the greatest amount of bias is potentially introduced by lithic analysts*. Refitting, and perhaps even more importantly microwear data should help to achieve more realistic results. But unfortunately at *Mesvin IV*, as for many early Middle Paleolithic sites, we do not have sufficient refitting and microwear data. Further more, the fact that these products played a role in the shaping of a volume does not exclude them of being intentional end products (e.g. *éclats débordants;* Beyries & Boëda, 1993). One of the objectives of this research is to study the complexity of lithic reduction. We will use this category in the first place to investigate how much effort was put into preparation and rejuvenation, without losing sight of the fact that we could not recognize all preparatory products and without excluding them from their possible use as end products.

About 7,5 % of the blanks have been identified as being preparation or rejuvenation products. Subdivided we see that most of the core volume preparation is represented by naturally backed knives (36 %) and *éclats débordants* (26 %). Of the latter we assume that most of them are related to Levallois technology. But as discoidal technology is also present, some of the *éclats débordants* could well have been part of a discoidal reduction sequence. Surprisingly about 10 % of the preparation/rejuvenation pieces are crested blades or flakes. Most of them are unilaterally prepared. This is a rather high percentage in comparison with the low abundance of blade cores, although we could imagine that not all of the crested products belong to prismatic blade technology.

Only eight bifacial thinning flakes can be related to the production of handaxes. They are nevertheless a possible indication of *in situ* handaxe manufacture or rejuvenation. Moreover, we mentioned earlier that a lot of these products can not easily be recognized.

Concerning the production of tools we mention two burin spalls and six retouch flakes. No systematic sieving was applied during excavation, so we can assume that most of the retouch flakes or burin spalls – if present off course – were not retrieved. In other words, these percentages are probably an underestimation.

2.3. End products

The category of the end products contains the majority of the products (62 %). The only criteria these products have to meet are to display less than 50 % of cortex and measuring more than 1 cm. As a consequence, it is a highly variable category containing products obtained by e.g. Levallois, discoidal, laminar, handaxe and other core technology. In our further description we will subdivide them in non-Levallois flakes and blades and Levallois end products. The recognition of discoidal and unprepared end products on the one hand and preparatory products on the other hand is problematic without sufficient refitting data. Although we could assume – based on the analysis of the unprepared core technology – that these products have more often unidirectional scar patterns, unprepared butts and a higher occurance of knapping accidents (which is, besides the fact that a lower amount of preparation could favour accidents, also due to the fact that some of these cores were reduced with the aid of an anvil).

2.3.1 Non-Levallois products

Non-Levallois end products are dominated by flakes (88 %). The blade component reaches 9 % and only 3 % of the end products are points.

Almost 70 % of the flakes have between one and three dorsal flake scars. About 16 % has four flake scars, while 14 % have more than five flake scars. Flakes have unidirectional (56 %) or bidirectional scar patterns (36 %). Of the latter scar negatives are orthogonal or X-shaped (both approximately 15 %) while opposite bidirectional detachments seem to be exceptional (5 %). Radial scar patterns are attested on 7% of the pieces. Most of the butts are plain (32%), punctiform (18%) or cortical (13%). To a lesser extent they are prepared: about 9 % of the flakes have a facetted butt but only one piece has a *chapeau de gendarme*. Dihedral butts were identified on 8 % of the flakes. Broken or shattered butts are not uncommon

(12 %). Knapping accidents are rather uncommon as 77 % of the flakes is « flawless ». When they happen, they are most of the time translated into stepped fractures (16 %) and to a lesser extent into overhangs (3 %) or Siret fractures (2 %).

About 74 % of the blades have between two and four scar negatives. 14 % has more than five scar negatives while 10 % has only one scar negative. Most blades have unidirectional scar patterns (62 %) while 28 % have bidirectional patterns (more or less equally devided between orthogonal, opposite and X-shaped). Radial scar patterns have been recognized on 9 % of the blades. Most platforms are plain (25 %), punctiform (21 %) or linear (13 %). In comparison with the flakes, slightly more blades have prepared platform types: 7 % are dihedral and 11 % are facetted. A lot of the blades have broken or shattered platforms (16 %), while cortical types are rather uncommon (5 %). Within the blades there is less evidence of knapping accidents as 80 % does not show any traces. Stepped fractures are most popular (14 %), followed by Siret fractures (3 %) and overhangs (1 %).

Most points have three scar negatives on their dorsal side (41 %), and to a lesser extent two (16 %), four (12 %), five (16 %) or more than six (11 %). Most of them are unidirectional (48 %) or bidirectional (48 %). Of the latter about half of them are orthogonal, the others X-shaped and very few opposite bidirectional. Radial scar patterns occur rarely. Most platform types are plain (45 %), while dihedral types are not uncommon (13 %). To a lesser extent they are cortical or punctiform (both 9 %), linear, punctiform or facetted (each 7 %). About 94 % of them do not show any traces of knapping accidents.

Although blades seem to show a more elaborate preparation, they share some major features with the flakes: most of the blanks have between one and four dorsal negatives. Although unidirectional patterns dominate, an important percentage shows the existence of a bidirectional exploitation. Radial patterning is uncommon. Most platforms do not show traces of preparation, although dihedral and facetted butts do occur (especially within the category of blades). The amount of knapping accidents seems to be rather low. Points show more variation in the amount of dorsal negatives, and most of them have more than three negatives. Unidirectional and bidirectional patterns are equally represented. Platform types are dominated by plain and dihedral butts. And almost no pieces show traces of any knapping accident.

2.3.2 Levallois end products

120 products (2 % of the total industry or 4 % of the category of end products) are classified as Levallois end products (*sensu* Van Peer 1992: 10). Criteria for their recognition are not exclusive and other reduction methods – e.g. discoidal reductions – can produce comparable products. For example, at the site of Meillers (Alliers, France), Pasty (2000) describes a series of flakes wich show on the dorsal side several negatives with centripetal or parallel bidirectional flaking scars, and a triangular cross-section. As at this site the discoidal method is dominant and his analysis was supported by refitting, he could prove that these products were part of a discoidal sequence. Their purpose was to reduce the convexity of the core. Moreover, facetted butts appeared to be very common among the discoidal end products (Pasty, 2000: 180). Other examples of prepared non-Levallois methods producing Levallois end products are known at the site of Bettencourt-Saint-Ouen (Locht, 2002) and Remicourt (Bosquet *et al.*, in prep.).

About 47 % of the end products show a radial scar pattern, while unidirectional (20 %), normal (17 %) and bidirectional (16 %) products are also common. Most of them have a facetted butt (61 %), although this facetting shows a lot of variability in quality and only a few can be catalogued as *chapeau-de-gendarme*. We found most of the facetted butts within the category of products with normal dorsal scar patterns (67 %), followed by the unidirectional types (50 %) and bidirectional types (43 %). Surprisingly we found the lowest percentages among products with a radial scar pattern, where only 33 % of the butts are facetted. This is contradictory to the results of the analysis by Dibble (1995) on the early Middle Paleolithic site of Biache-Saint-Vaast (France) where radial scar patterns, facetting and smaller sized products were associated with later stages within the same reduction sequence. At *Mesvin IV* we do not find such a metrical relationship, quite on the contrary radial typed flakes seem to be on average larger (although we should admit that there is more metrical variability between radial flakes in comparison with the other types). Unidirectional typed products are on average smaller and less volumetric. So we could conclude that they represent a distinctive reduction scheme. Concerning the type of blank, flakes are dominant for all scar types. But in contrast with uni-, bidirectional and normal types – with percentages between 54 % and 67 % - they are most dominant within the radial scarred types with percentages around 91 %. Blades are most of the time produced within the unidirectional, bidirectional and normal types (percentages ranging between 21 % and 25 %), but points are only regularly produced by unidirectional (21 %) and normal (23 %) scarring. Almost 80 % of the Levallois end products do not show signs of knapping accidents, which is just slightly higher in comparison with other products. About 9 % are hinged fractures and quite some products have overhangs (6 %), a type of accident that rarely appears among the other products. Siret fractures are lacking. About 65 % of these products have a facetted butt while only 24 % have a plain and 7 % have a dihedral butt. Not a single Levallois end product shows less than three dorsal flake scars while 43 % shows more than six. These characteristics are comparable to the ones of the modified tools but as we describe further on in this article, Levallois end products do show a higher level of preparation in comparison with tools. Concerning the amount of cortical residues, it seems that 76 % of these products do not show any traces of cortex. A metrical analysis made clear that Levallois end products are on the whole longer, wider and thicker than the other end products. This is also true for modified tools. But Levallois end products are also bigger than modified tools, at least if we consider length and width. Concerning their average thickness it seems that Levallois end products are considerably less volumetric than tools[1].

2.4. Tools

Blanks which are modified by retouching, burin spalls or bifacial flaking belong to the category of modified tools. About 3 % of the industry belongs to this category. It is a relatively low percentage which does seem to be typical for a lot of Middle Paleolithic assemblages. It could also be an indication that at *Mesvin IV* an important part of the assemblage belonged to knapping activities. A detailed metrical and attribute analysis will be shortly published (Ryssaert, in press).

The typological composition is represented in table 2 (following Bordes, 1961; with exclusion of unretouched Levallois end products and backed knives). Scrapers are the most important category and are dominated by single scraper types (42 %). Retouches are most of the time scalariform, and occasionaly subparallel. Within the Late Paleolithic group (20 %), endscrapers dominate while burins and borers occur to a lesser extent. Notched tools and denticulates represent 13 % of the tools. Notches are most of the time multiple, alongside a minority of clactonian notches. Points are very rare. Some of the tools show a proximal thinning, in this respect one of them can be catalogued as a typical Kostienki knive.

Most of the selected blanks are flakes (57 %) and to a lesser extent Levallois end products (17 %), core rejuveanation products (12 %) and blades (10 %). Large, thick flakes were slightly more used for the production of single scrapers as were certain types of core rejuvenation (naturally backed knives and *éclats débordants*), while Levallois end products are most of the time marginally retouched. About 32 % of these tools have small cortical remnants on their dorsal side and products with cortex between 25 %-50 % represent 12 %. This means that although blanks with some degree of cortex are not excluded, cortical blanks (more than 50 % of cortex) are nevertheless underrepresented. This is especially true for the category of burins and borers. Most of the tools show a lot of dorsal scar negatives (21 % show three negatives, 13 % shows four negatives, 21 % shows five negatives and 22 % more than six negatives). This is in clear contrast with the category of unmodified end products. The same

Points	*3*
moustier point	1
tayac point	1
limace	1
Scrapers	*47*
single concave scraper	3
single convex scraper	16
single straight scraper	7
double convex scraper	2
double straight-convex scraper	2
convex convergent scraper	1
déjeté scraper	1
straight transversal scraper	1
convex transversal scraper	2
alternating scraper	2
bifacial scraper	4
scraper with ventral retouching	4
concave transversal scraper	2
Late Paleolithic group	*22*
typical endscraper	3
atypical endscraper	7
typical borer	1
atypical borer	5
atypical burin	5
raclette	1
Notches and denticulates	*15*
denticulated tool	7
notched tool	6
alternate retouched bec	2
Miscellaneous	*26*
rabot	1
retouched fragment	14
retouched tool	11
Total	*113*

Tab. 2 — Typological composition of the flakes tools.

1. For a detailed analysis of these characteristics see Ryssaert, in press.

can be said about the preparation of the platform: percentages for facetted buttypes rise to 38 %, while cortical (14 %) and plain types (36 %) seem to be comparable to the percentages for the unmodified end products. The metrical analysis of tools and unmodified blanks has shown that tool blanks are on the means larger and thicker. So we have here a very clear pattern in which well prepared, voluminuous blanks have been selected for the production of tools. Off course this intense preparation favours not only a better control over the shape of the blank but also guarantees the production of bigger products.

Sixteen bifaces or fragments of bifaces testify of a handaxe technology. This group is very diverse. They can be subdivided in a smaller group of handaxes (one micoquian, one naviform, one core handaxe, and some almondshaped handaxes). Most of these handaxes have been made on a small nodule. They show regular retouching (scalar and semi-scalar) on both sides along the full perimeter, exept of the micoquian and one almondshape handaxe which have a cortical base. Small cortical remnants are to be seen on most of these handaxes. According to Cahen & Michel (1986: 100) this group could possibly antedate the assemblage of *Mesvin IV* because of the presence of frost cupules postdating their manufacture. But according to our own analysis about 1 % of the material shows frost alteration before knapping and about 2 % after knapping. Most of these frost cupules can be seen on the bigger pieces (e.g. cores, but also handaxes). In this sense we do not agree that this can be used as an argument[2]. A group of bifacial tools with a strong *Keilmesser* influence contains nine pieces (*sensu* Bosinski, 1967): they display an asymmetrical D-shaped form, and most of them have a tranchet blow on the top. One bifacially worked edge is positioned in opposition of a partially unworked back. Only one of these *Keilmesser* has been made on a nodule, while most of them have been made on large, thick flakes. Soriano (2001) studied these bifacial tools in detail, and quite interestingly found a comparable treatment of some of the flaked tools. On a functional level, Soriano proposes, there does not seem to be a difference. Instead, the bifacial tools represent an extended *chaîne opératoire* in comparison with these flaked tools (Soriano, 2001: 82).

2. We do not intent to claim here that the assemblage is homogeneous. Time averaging as a consequence of mixed assemblages is a common problem for Middle Paleolithic industries. The secundary position and important size of the assemblage of *Mesvin IV* rather indicates a possible mixture of several occupations, but was probably « limited » in time (meaning the period in which the canals were formed, see: Ryssaert, in prep.).

The last category of tools consists of two chopping-tools which have been made on small nodules. Although it is sometimes difficult to differentiate them from cores, the final small retouches on the working edge suggests these have been used as tools.

2.5. Cores

The category of cores contains all types of cores representing various reduction stages and takes up to 1,7 % of the industry.

2.5.1 Levallois cores

The analysis of the Levallois cores has been published in detail elsewhere (Ryssaert, 2004; Ryssaert, in prep.). A large group (N = 16) can be described as Levallois cores *sensu* Van Peer (Van Peer, 1992: 10; fig. 1:1-2). Radial preparation is the dominant pattern (N = 8) while unidirectional and bidirectional patterns do also occur (respectively one and four pieces). This is quite the opposite within a second group of « reduced » Levallois cores where unidirectional and bidirectional patterns dominate (respectively three and four pieces). This group of nine cores stands out by the application of a less intensive preparation of both upper and under surface (fig. 1:3-4). As a consequence end products of these reduced Levallois cores will be harder to recognize as some characteristic features will be lacking; e.g. a high number of dorsal scarring and prepared butt types.

This could leave us with the hypotheses that these so-called reduced Levallois cores represent early stages within a reduction system, whereas radial patterned « classic » Levallois cores represent later stages[3]. This can be partly investigated using metric data of the cores. It seems indeed that reduced Levallois cores are on average slightly larger in comparison with both « classic » Levallois cores on the whole and more specifically with radial patterned « classic » Levallois cores. But it is also true that bidirectional patterned reduced Levallois cores are on average larger in comparison with bidirectional patterned « classic » Levallois cores. If we only look at the relationship between measurements and upper preparation pattern within the « classic » Levallois cores than we see that radial patterned cores are on average larger than bidirectional cores. In contrast, within the group of reduced Levallois cores, the unidirectional patterned cores are on average larger. What we want to point out is that the choice of reduction pattern does not seem to reflect the stage in which the core has been abandoned. At least for the first group of Levallois

3. We use the word « classic » Levallois core to indicate that the core meets the characteristics described by Van Peer, 1992.

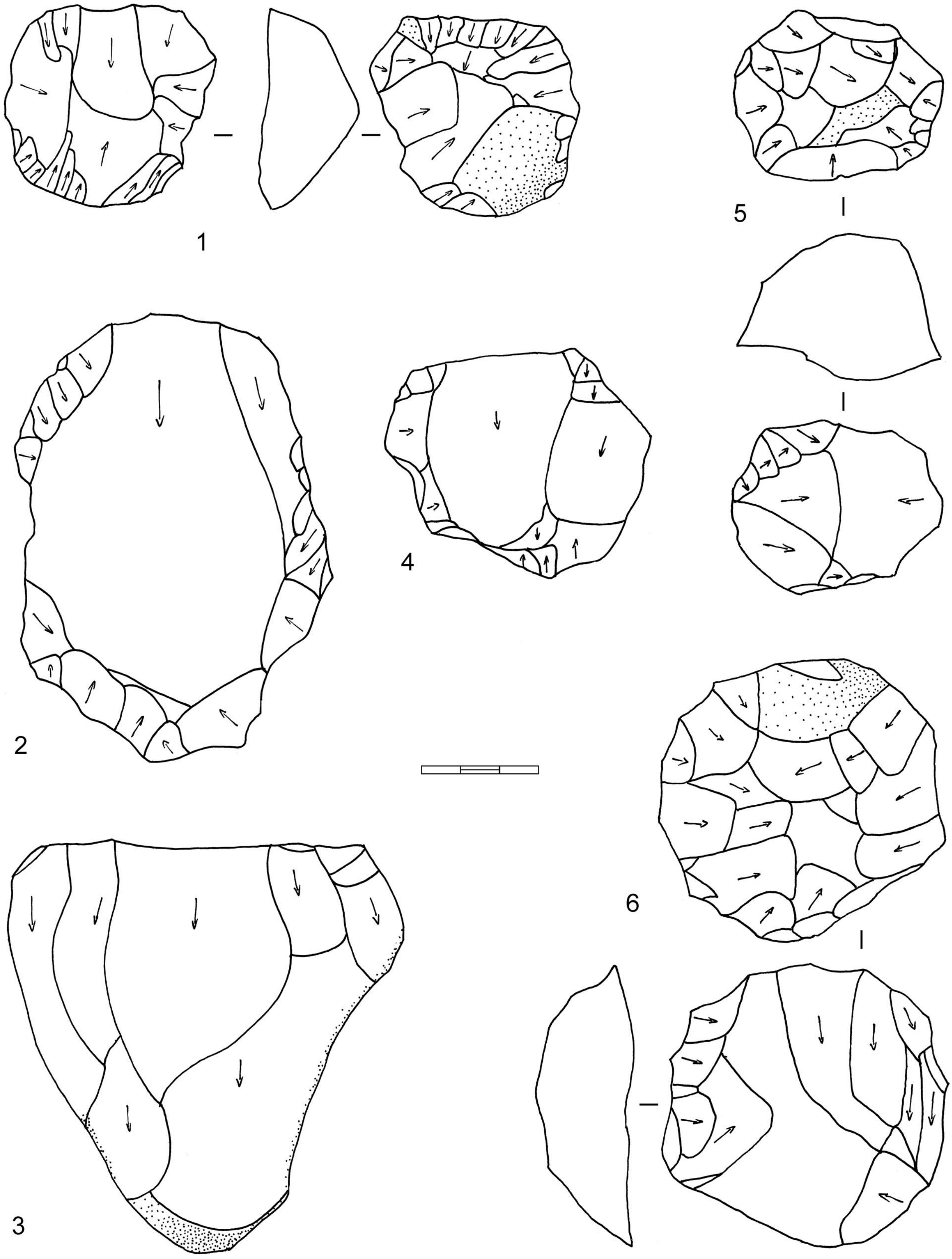

Fig. 1 — Prepared core technology: radial Levallois cores (1-2); reduced Levallois cores (3-4); discoidal cores (5-6).

cores. This has also been described for the analysis of the Levallois end products. Within the group of reduced cores there seems to be some sort of metrical relationship with the preparation pattern. Although we should admit that only one of these cores has been identified as a radial type, and comparison is therefore difficult. Indices of elongation and flattening can also give some information about the reduction state (Van Peer, 1992: 13). Quite surprisingly the elongation index of both « classic » and reduced Levallois cores do not seem to differ much (respectively 1,1 and 1,2). Also when comparing the different preparation patterns we are getting the same results. The flattening index shows some more variation: while « classic » Levallois cores have values around 2,3 ; the reduced Levallois cores are less flattened (on average 1,8) and could therefore be less intensely reduced. When we compare patterns it does seem to be so that radial patterned cores have the largest flattening index (on average 2,5) and the unidirectional are among the thickest pieces (on average 1,5). Calculating the elongation index of the scar negatives of the end products it is quite interesting to note they are both for the « classic » Levallois as for the reduced Levallois cores identical (on average 1,4).

2.5.2. Discoidal cores

Eleven cores represent discoidal technology (fig. 3: 5-6). The problems related to the formulation of discriminating criteria and the confusion which can arise with radial Levallois technology (*sensu* Boëda, 1994) has been discussed on numerous occasion in the literature (e.g. Boëda, 1994; Peresani,2003, Locht *et.al.;* 1995). The cores described here stand out by their recurrent, radial exploitation of end products. These end products do not consume a large part of the core surface and most of the time their detachment does not run parallel with the intersection line. A hierarchy between upper and under surface can be lacking. About half of them are unifacially exploited, the others show a bifacial exploitation. Individual preparation of platforms is not uncommon and occasionally facetting is applied.

2.5.3. Blade cores

Besides one Levallois blade core, blade technology is represented by two other cores. One of these pieces shows a limited unidirectional production of blades by which the natural, prismatic morphology of the elongated nodule determines to a large extent the morphology of the end products. A second core shows a more elaborated technique with the use of a simple dorsal crest and the facetting of a single platform. Although limited, these three cores nevertheless witness of the importance of blade technology in the early phases of the Middle Paleolithic. Their existence has been highlighted for several other early Middle Paleolithic sites e.g. Saint-Valéry-sur-Somme, Bagarre and Veldwezelt-Hezerwater, and some Early Paleolithic occurences have been noticed (Révillon, 1995; Bringmans *et al.*, 2001). Quite some of the end products have been diagnosed as being blades (9 %) and among the core preparation products about 10 % are crested blades or flakes. So it seems that in comparison with the blade cores, blade products are overrepresented in the industry – especially considering the fact that two of the cores have a limited reduction. But off course blade products can be produced during other reduction systems (e.g. uni- and bidirectional Levallois technology and the semi-peripheral double platform technology which will be described later on).

2.5.4. Double platform cores

For a group of six cores it is rather difficult to find a proper label: they have two opposed platforms and a semi-peripheral reduction takes place producing flakes and flake-blades. They stand out by a more systematic control and recurrent detachment of blanks, although – based on volumetric considerations – we do not consider them as Levallois cores.

2.5.5. Unprepared cores

The title of this paragraph is somewhat misleading as it is in our opinion hard to decide for current researchers which reductional methods where prepared and which were not. We agree with Baumler (1995) who emphasizes that because the reductional process is irreversable and directional ... *that a planned approach is essential to achieving consistent and efficient results in lithic production; predetermination in this sense should be an expectation more often than an exception* (Baumler, 1995: 12). Off course, predetermination and preparation are not entirely the same thing, but most researchers would probably agree there exists a strong relationship between the two. The cores described here are examples which have not been recognized by us as belonging to a more or less standardized, elaborate reduction method as e.g. Levallois and discoidal methods are. Nevertheless comparable examples are to be found in a lot of Middle Paleolithic industries, so their methods were successfully applied over a long period. Their description as being unprepared has more to say about the way current researchers are looking at these industries and we would like to suggest that their role is being underestimated both on a quantitative as qualitative level.

In earlier publications we described these cores based on the amount of platforms and volume concept (Ryssaert, 2004). But it seems that most of these cores are clearly examples of what has been described by e.g.

White and Ashton (2003) as migrating-platform cores: *... cores of the kind that typify Lower Palaeolithic technology in Europe. The working of these cores consists of one or more sequences of flaking (core episodes), each episode involving single, parallel, or, most often, alternate flaking (Ashton 1998). Knapping generally proceeds in a varied and organic fashion, with the evolving morphology of the core strongly influencing the location and character of each core episode. The resulting cores vary enormously in morphology and the degree of working appears to be the removal of mediumsized flakes...* (White & Ashton, 2003: 599).

We consider 17 cores to be part of this technological system. About eight of them show a rather limited single platform reduction, three cores have two separated orthogonal positioned platforms and six cores represent a more intense reduction with the use of multiple platforms. Interestingly it is only in this category of cores that we found clear evidence of the use of a bipolar/anvil technique (for more details see Ryssaert, 2005). Based on the scar negatives of these cores we can conclude that most of the produced blanks have a limited amount of dorsal scar negatives, non-prepared butts and are limited in size. In other words, they were probably less suitable for further modification into tools and possibly served a more ad-hoc use at the te. On a quantitative level this means that almost $^1/_3$rd of the cores belong to this category and that a large part of the end products show features which could be characteristic for this reduction system. It is hard to identify them but we should nevertheless take into account that this technology produced an important part of the industry.

A last category consists of chips (pieces < 1cm) and represents only 4,5 % of the assemblage. This seems to be low, but during excavation there was no systematic sieving and therefore we can not use these numbers for technological or spatial analysis.

Of 4,1 % of the pieces we were not able to reconstruct in which reduction stage they belonged.

2.6. Conclusion

In the assemblage of *Mesvin IV* all stages of core reduction are present. They represent on the one hand prepared core technology – meaning Levallois, discoidal, blade and double platform technology – and these were applied for the production of blanks which could be used unmodified and modified. On the other hand a large part of the industry shows the use of less elaborated systems of core reduction and most of them can be described as a migrating-platform technology. It seems that blanks produced during these reductions were to a much lesser extent selected as modified tool blanks. Modified flaked tools and Levallois end products distinguish themselves by an intense preparation (amount of dorsal scarring, platform preparation) and a bigger volume, although Levallois end products are in comparison thinner. These Levallois end products are only slightly more used as tool blanks. Bifacial technology was applied, at least partly, *in situ* and is represented by two different concepts: « late Acheulean » handaxes made on nodules and bifacial tools with strong *Keilmesser* influences. A final technological concept is being represented by the presence of two chopping-tools.

We have here all major technological features which will become typical for the Middle Paleolithic. But in this industry we notice still a strong Acheulean influence essentially in the presence of the migrating platform and handaxe technology.

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